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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Best Available Copy

Office Action Summary	Application No. 10/826,016	Applicant(s) IMASEKI ET AL.
	Examiner Ben Lewis	Art Unit 1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ______.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-19* is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) *1 and 3-19* is/are rejected.

7)☐ Claim(s) ______ is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/29/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ______ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: ______.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 29th, 2007 has been entered. Claims 1,3,5,9,13, 15 and 17-19 has been amended. Claim 2 has been cancelled.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (U.S. Pub. No. 2001/0019789 A1) in view of Mizuno (U.S. Pub. No. 2002/0189873 A1).

With respect to claim 1, Hirakata et al. disclose a heat exchange system (title) wherein a radiator **10** is a heat exchange device for cooling the cooling water warmed by the fuel cell **30**, and includes an upper tank **12** and a lower tank **14** for temporarily storing the cooling water, and a core **16** for passing the cooling water (Paragraph 0032).

With respect to separating the fuel gas from the cooling liquid, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** "means for detecting fuel gas" immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can be easily discharged "exhausted" into the air by opening the radiator cap **18** and the cooling water supply cap **24**, respectively (Paragraph 0060). (It is noted that hydrogen gas is separated from the cooling liquid in tanks **12** and **20** due to their difference in density).

With respect to the mixing of the separated gas with the air supplied or exhausted from the fuel cell, Hirakata teach that when the pressure inside the upper tank **12** is high, the cooling water is pushed out as described above from the upper tank **12** into the reserve tank **20** through the cooling water tube **65** so that the hydrogen gas (separated gas) caught within the upper tank **12** is also pushed out into the reserve tank

20 along with the cooling water. The hydrogen gas pushed out together with the cooling water turns into bubbles in the cooling water **22** and floats up to the surface of the water, to be present at the top of the reserve tank **20** (Paragraph 0058). Hirakata also teach that the reserve tank **20** is a simple sealed type reserve tank, and an air intake tube **66** connects to the reserve tank **20** to maintain atmospheric pressure inside the reserve tank **20** (Paragraph 0043). (It is noted that air form air intake tube mixes with hydrogen at the top of tank **20**).

With respect to exhausting the gas, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can be easily discharged "exhausted" into the air by opening the radiator cap **18** and the cooling water supply cap **24**, respectively (Paragraph 0060).

Hirakata et al. does not specifically teach using air supplied to or exhausted from the fuel cell. However, Mizuno disclose an on-vehicle structure of fuel cell system wherein the hydrogen gas discharged from the shut valve **412** is supplied to the hydrogen dilutor **424** after flowing through the discharging channel **405**. Oxygen off-gas is also supplied to the hydrogen dilutor **424** after flowing through the oxygen off-gas introducing channel **505** which branches from the oxygen off-gas discharging channel **503**. The hydrogen dilutor **424** dilutes the discharged hydrogen gas from the shut valve

412 by mixing the supplied hydrogen gas and the oxygen off-gas. The diluted hydrogen gas is introduced into the oxygen off-gas discharging channel **503** and is further mixed with the oxygen off-gas flowing in the oxygen off-gas discharging channel **503**. Then the mixed gas is exhausted into the external atmosphere from the off-gas discharging outlet **514**. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dilution of hydrogen gas with exhaust air system of Mizuno to dilute the hydrogen of Hirakata et al. because an air diluted exhaust gas with low hydrogen concentration is more safe.

Furthermore, Applicant's specification teaches that purged gas can be exhausted from the fuel cell system or exhausted to the fuel cell (See Pages 4 and 5). Since both exhaust means are equivalent in accomplishing the reduction of hydrogen in the coolant stream and there is no showing of unexpected results or showing of criticality of exhausting hydrogen outside the system as opposed to exhausting hydrogen to the cathode of the fuel cell as claimed by the Applicant, then the exhaust means of Hirakata et al. as modified by Mizuno which exhausts air outside the system is an obvious variant of Applicant's exhausting air to the cathode of the fuel cell.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (U.S. Pub. No. 2001/0019789 A1) in view of Mizuno (U.S. Pub. No. 2002/0189873 A1) and further in view of Jia et al. (U.S. Pub. No. 2003/0224226 A1).

With respect to claim 2, Hirakata et al as modified by Mizuno disclose a heat exchange system (title) in paragraph 7 above. Hirakata et al. as modified by Mizuno do

not specifically teach wherein the gas mixed with air supplied to the fuel cell is introduced into the cathode of the fuel cell. However, Jia et al. disclose a conditioning methode for fuel cells (title) wherein, controller **18** signals oxidant shutoff valve **15** to close and signals fuel shutoff valve **16** and fuel conditioning valve **17** to open thereby providing hydrogen directly to cathode **4** (Paragraph 0021). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the hydrogen feed to the cathode of Jia et al. into the fuel cell system of Hirakata et al. as modified by Mizuno because combustion of hydrogen internally as opposed to environmental exhaustion improves safety of the fuel cell system.

4. Claim 3-6, 8-12 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (U.S. Pub. No. 2001/0019789 A1) in view of Mizuno (U.S. Pub. No. 2002/0189873 A1).

With respect to claims 3, 9 and 15, Hirakata et al. disclose a heat exchange system (title) wherein a radiator **10** is a heat exchange device for cooling the cooling water warmed by the fuel cell **30**, and includes an upper tank **12** and a lower tank **14** for temporarily storing the cooling water, and a core **16** for passing the cooling water (Paragraph 0032). Hirakata et al. also teach that the cooling water cooled and stored in the lower tank **14** flows out from the lower tank **14** to reach the fuel cell **30** through the cooling water passage **60**. A water pump **70** is provided midway in the cooling water passage **60** so as to forcibly circulate the cooling water flowing through the cooling

water passage **60**. The water pump **70** and another water pump **76** which will be described later are both electrically driven (Paragraph 0034).

With respect to the liquid storage container communicating with the circulation passage via a gas drawing passage and wherein the air incorporated into the siglan pressure pipe from the supply air piple side is pushed back towards said air supply pipe, Hirakata et al. teach that when the pressure inside the upper tank **12** is high, the cooling water is pushed out as described above from the upper tank **12** into the reserve tank **20** through the cooling water tube **65** "gas drawing passage" so that the hydrogen gas caught within the upper tank **12** is also pushed out into the reserve tank **20** along with the cooling water. The hydrogen gas pushed out together with the cooling water turns into bubbles in the cooling water **22** and floats up to the surface of the water, to be present at the top of the reserve tank **20** (Paragraph 0058). Hirakata also teach that the reserve tank **20** is a simple sealed type reserve tank, and an air intake tube **66** connects to the reserve tank **20** to maintain atmospheric pressure inside the reserve tank **20** (Paragraph 0043).

With respect to exhausting the gas, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can

be easily discharged "exhausted" into the air by opening the radiator cap **18** and the cooling water supply cap **24**, respectively (Paragraph 0060).

Hirakata et al. does not specifically teach using air supplied to or exhausted from the fuel cell. However, Mizuno disclose an on-vehicle structure of fuel cell system wherein the hydrogen gas discharged from the shut valve **412** is supplied to the hydrogen dilutor **424** after flowing through the discharging channel **405**. Oxygen off-gas is also supplied to the hydrogen dilutor **424** after flowing through the oxygen off-gas introducing channel **505** which branches from the oxygen off-gas discharging channel **503**. The hydrogen dilutor **424** dilutes the discharged hydrogen gas from the shut valve **412** by mixing the supplied hydrogen gas and the oxygen off-gas. The diluted hydrogen gas is introduced into the oxygen off-gas discharging channel **503** and is further mixed with the oxygen off-gas flowing in the oxygen off-gas discharging channel **503**. Then the mixed gas is exhausted into the external atmosphere from the off-gas discharging outlet **514**. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dilution of hydrogen gas with exhaust air system of Mizuno to dilute the hydrogen of Hirakata et al. because an air diluted exhaust gas with low hydrogen concentration is more safe.

Furthermore, Applicant's specification teaches that purged gas can be exhausted from the fuel cell system or exhausted to the fuel cell (See Pages 4 and 5). Since both exhaust means are equivalent in accomplishing the reduction of hydrogen in the coolant stream and there is no showing of unexpected results or showing of criticality of exhausting hydrogen outside the system as opposed to exhausting hydrogen to the

cathode of the fuel cell as claimed by the Applicant, then the exhaust means of Hirakata et al. as modified by Mizuno which exhausts air outside the system is an obvious variant of Applicant's exhausting air to the cathode of the fuel cell.

With respect to claims 4 and 6, With respect to exhausting the gas, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can be easily discharged "exhausted" into the air by opening the radiator cap **18** "means for changing pressure of air exhausted from the fuel cell" and the cooling water supply cap **24**, respectively (Paragraph 0060).

Hirakata et al. also teach that when the pressure inside the upper tank **12** is high, the cooling water is pushed out as described above from the upper tank **12** into the reserve tank **20** through the cooling water tube **65** "gas drawing passage" so that the hydrogen gas caught within the upper tank **12** is also pushed out into the reserve tank **20** along with the cooling water. The hydrogen gas pushed out together with the cooling water turns into bubbles in the cooling water **22** and floats up to the surface of the water, to be present at the top of the reserve tank **20** (Paragraph 0058). Hirakata also teach that the reserve tank **20** is a simple sealed type reserve tank, and an air intake

tube **66** connects to the reserve tank **20** to maintain atmospheric pressure inside the reserve tank **20** “exhaust pipe” (Paragraph 0043).

With respect to claim 10,16,17 and 19, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** “means for detecting fuel gas” immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** “hydrogen separator” of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** “hydrogen separator” can be easily discharged “exhausted” “decrease pressure” into the air by opening the radiator cap **18** “means for controlling flow of ventilation current” “means for increasing ventilation amount” and the cooling water supply cap **24**, respectively (Paragraph 0060).

With respect to claims 11,12 and 18, Hirakata et al. teach that when the pressure inside the upper tank **12** is high, the cooling water is pushed out as described above from the upper tank **12** into the reserve tank **20** through the cooling water tube **65** “gas drawing passage” so that the hydrogen gas caught within the upper tank **12** is also pushed out into the reserve tank **20** along with the cooling water. The hydrogen gas pushed out together with the cooling water turns into bubbles in the cooling water **22** and floats up to the surface of the water, to be present at the top of the reserve tank **20** (Paragraph 0058). Hirakata also teach that the reserve tank **20** is a simple sealed type

reserve tank, and an air intake tube **66** connects to the reserve tank **20** to maintain atmospheric pressure "stationary pressure" inside the reserve tank **20** "exhaust pipe" (Paragraph 0043).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (U.S. Pub. No. 2001/0019789 A1) in view of Mizuno (U.S. Pub. No. 2002/0189873 A1) as applied to claim 3 above and further in view of Kaneko et al. (U.S. Patent No. 4,923,768).

With respect to claim 7, Hirakata et al. as modified by Mizuno disclose a heat exchange system (title) in paragraph 4 above.

Hirakata et al. as modified by Mizuno do not specifically teach means for changing the pressure of the air supplied to the fuel cell from the air supply pipe. However, Kaneko et al. disclose a fuel cell power generation system (title) wherein the fuel cell power generation system of the present invention comprises an air pressure control circuit means having a pressure sensing device on the outlet side of the compressor and a flow rate control valve on the inlet side of the compressor. The control circuit serves to improve partial load efficiency by allowing the adjustment of reaction air flow to maintain constant reaction air pressure in the fuel cell (Col 3 lines 20-35). Axial power of the reaction air compressor is controlled in order to maintain a predetermined outlet pressure at a constant value, or within a desired range, by controlling a flow rate valve connected to the inlet side of the compressor which is effective, for example, in lowering the flow rate during the partial load operation. The

axial power of the compressor during the partial load operation can also be lowered by control of the drive motor and the partial load efficiency can be improved (Col 3 lines 60-67). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the controlling of the air feed of Kaneko et al. into the fuel cell system of Hirakata et al. as modified by Mizuno in order to improve partial load efficiency (Col 3 lines 60-67).

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (U.S. Pub. No. 2001/0019789 A1) in view of Mizuno (U.S. Pub. No. 2002/0189873 A1) and further in view of Jia et al. (U.S. Pub. No. 2003/0224226 A1).

With respect to claim 13, Hirakata et al. disclose a heat exchange system (title) wherein a radiator **10** is a heat exchange device for cooling the cooling water warmed by the fuel cell **30**, and includes an upper tank **12** and a lower tank **14** for temporarily storing the cooling water, and a core **16** for passing the cooling water (Paragraph 0032).

With respect to the mixing of the separated gas with the air supplied or exhausted from the fuel cell, Hirakata teach that when the pressure inside the upper tank **12** is high, the cooling water is pushed out as described above from the upper tank **12** into the reserve tank **20** through the cooling water tube **65** so that the hydrogen gas caught within the upper tank **12** is also pushed out into the reserve tank **20** along with the cooling water. The hydrogen gas pushed out together with the cooling water turns into bubbles in the cooling water **22** and floats up to the surface of the water, to be present at the top of the reserve tank **20** (Paragraph 0058). Hirakata also teach that the

reserve tank **20** is a simple sealed type reserve tank, and an air intake tube **66** connects to the reserve tank **20** to maintain atmospheric pressure inside the reserve tank **20** (Paragraph 0043).

With respect to exhausting the gas, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can be easily discharged "exhausted" into the air by opening the radiator cap **18** and the cooling water supply cap **24**, respectively (Paragraph 0060).

Hirakata et al. does not specifically teach using air supplied to or exhausted from the fuel cell. However, Mizuno disclose an on-vehicle structure of fuel cell system wherein the hydrogen gas discharged from the shut valve **412** is supplied to the hydrogen dilutor **424** after flowing through the discharging channel **405**. Oxygen off-gas is also supplied to the hydrogen dilutor **424** after flowing through the oxygen off-gas introducing channel **505** which branches from the oxygen off-gas discharging channel **503**. The hydrogen dilutor **424** dilutes the discharged hydrogen gas from the shut valve **412** by mixing the supplied hydrogen gas and the oxygen off-gas. The diluted hydrogen gas is introduced into the oxygen off-gas discharging channel **503** and is further mixed with the oxygen off-gas flowing in the oxygen off-gas discharging channel **503**. Then the mixed gas is exhausted into the external atmosphere from the off-gas discharging

outlet **514**. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dilution of hydrogen gas with exhaust air system of Mizuno to dilute the hydrogen of Hirakata et al. because an air diluted exhaust gas with low hydrogen concentration is more safe.

With respect to returning the mixed gas into said air supply air pipe via said outflow pipe, Hirakata et al as modified by Mizuno disclose a heat exchange system (title) in paragraph 2 above. Hirakata et al. as modified by Mizuno do not specifically teach wherein the gas mixed with air supplied to the fuel cell is introduced into the cathode of the fuel cell. However, Jia et al. disclose a conditioning methode for fuel cells (title) wherein, controller **18** signals oxidant shutoff valve **15** to close and signals fuel shutoff valve **16** and fuel conditioning valve **17** to open thereby providing hydrogen directly to cathode **4** (Paragraph 0021). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the hydrogen feed to the cathode of Jia et al. into the fuel cell system of Hirakata et al. as modified by Mizuno because combustion of hydrogen internally as opposed to environmental exhaustion improves safety of the fuel cell system.

With respect to claim 14, Hirakata et al. teach that in the heat exchange system of the present embodiment, if hydrogen gas leaks into the cooling water, the hydrogen sensors **50** and **52** "means for detecting fuel gas" immediately detect the leakage, and the hydrogen gas leakage warning lamp **92** informs the driver of the leakage. The hydrogen gas collected in the upper tank **12** "hydrogen separator" of the radiator **10** and

the hydrogen gas collected at the top of the reserve tank **20** "hydrogen separator" can be easily discharged "exhausted" into the air by opening the radiator cap **18** and the cooling water supply cap **24**, respectively (Paragraph 0060).

Response to Arguments

7. Applicant's arguments filed on October 29th, 2007 have been fully considered but they are not persuasive.

Applicant's principal arguments are

(a) The Mizuno reference discloses a hydrogen dilutor (424) that receives the hydrogen gas discharged from the fuel cell. The Mizuno reference also discloses that the hydrogen dilutor (424) receives the oxygen off-gas discharged from the fuel cell. The hydrogen dilutor (424) dilutes the discharged hydrogen gas by mixing the hydrogen gas and the oxygen off-gas. The diluted hydrogen gas is introduced into the oxygen off-gas discharging channel (503). The Mizuno reference, however, does not disclose or suggest that the mixed gas is introduced to the cathode of a fuel cell, as required by claim 1.

In response to Applicant's arguments, please consider the following comments.

(a) Hirakata et al. does not specifically teach using air supplied to or exhausted from the fuel cell. However, Mizuno disclose an on-vehicle structure of fuel cell system wherein the hydrogen gas discharged from the shut valve **412** is supplied to the hydrogen dilutor

424 after flowing through the discharging channel **405**. Oxygen off-gas is also supplied to the hydrogen dilutor **424** after flowing through the oxygen off-gas introducing channel **505** which branches from the oxygen off-gas discharging channel **503**. The hydrogen dilutor **424** dilutes the discharged hydrogen gas from the shut valve **412** by mixing the supplied hydrogen gas and the oxygen off-gas. The diluted hydrogen gas is introduced into the oxygen off-gas discharging channel **503** and is further mixed with the oxygen off-gas flowing in the oxygen off-gas discharging channel **503**. Then the mixed gas is exhausted into the external atmosphere from the off-gas discharging outlet **514**. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dilution of hydrogen gas with exhaust air system of Mizuno to dilute the hydrogen of Hirakata et al. because an air diluted exhaust gas with low hydrogen concentration is more safe.

Furthermore, Applicant's specification teaches that purged gas can be exhausted from the fuel cell system or exhausted to the fuel cell (See Pages 4 and 5). Since both exhaust means are equivalent in accomplishing the reduction of hydrogen in the coolant stream and there is no showing of unexpected results or showing of criticality of exhausting hydrogen outside the system as opposed to exhausting hydrogen to the cathode of the fuel cell as claimed by the Applicant, then the exhaust means of Hirakata et al. as modified by Mizuno which exhausts air outside the system is an obvious variant of Applicant's exhausting air to the cathode of the fuel cell.

With respect to returning the mixed gas into said air supply air pipe via said outflow pipe. Hirakata et al. as modified by Mizuno do not specifically teach wherein the gas mixed with air supplied to the fuel cell is introduced into the cathode of the fuel cell. However, Jia et al. disclose a conditioning method for fuel cells (title) wherein, controller **18** signals oxidant shutoff valve **15** to close and signals fuel shutoff valve **16** and fuel conditioning valve **17** to open thereby providing hydrogen directly to cathode **4** (Paragraph 0021). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the hydrogen feed to the cathode of Jia et al. into the fuel cell system of Hirakata et al. as modified by Mizuno because combustion of hydrogen internally as opposed to environmental exhaustion improves safety of the fuel cell system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ben Lewis

Patent Examier
Art Unit 1745

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER